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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,444	12/19/2003	Maurice Milgram	1948-4830	7680
27123 7590 03/07/2007 MORGAN & FINNEGAN, L.L.P. 3 WORLD FINANCIAL CENTER NEW YORK, NY 10281-2101			EXAMINER WANG, CLAIRE X	
			ART UNIT	PAPER NUMBER
			2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/743,444

Applicant(s)

MILGRAM ET AL.

Examiner

Claire Wang

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the method of independent claim 1 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. As to Fig. 7, it is objected to under 37 CFR 1.83(a) because it fail to show the detail as described in the specification. Fig. 7 should be amended to include clearly labeled part names instead of only having numbers as the labels. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 11 is objected to because of the following informalities:

Line 1 of claim 11, the phrase "according to" should be added between the phrases "A method" and "Claim 3."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

1. Claims 1-27 are rejected under second paragraph of 35 U.S.C. 112.

As to Claim 1, it recites the limitations "these light gradient" in line 8, "the gradients" in line 9 and "the bend" in line 12. There are insufficient antecedent basis for these limitations in the claim. Examiner suggests changing the first two limitations to "the light decrease gradients" and the third limitation to "a bend of the road." In order to further prosecution, examiner will read said limitations as "the light decrease gradients" and "a bend of the road."

As to Claim 3, it recites the limitation "the decrease gradient" in line 2. There is insufficient antecedent basis for this limitation in the claim. Examiner suggests changing said limitation to "the light decrease gradient." In order to further prosecution, examiner will read said limitation as "the light decrease gradient."

Claims 2 and 4-27 are rejected because they are dependent from claims 1 and 3.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nichani (US 6,819,779) in view of Yasui et al. (US 5,922,036 hereinafter "Yasui").

As to claim 1, Nichani teaches a method of detecting from a vehicle variations in path on a road having a surface and road edges (road lane detection system; Col. 1, line 8) comprising the steps of, taking an image of a road scene unfolding in front of the vehicle (Fig. 1 shows the top view of a car with a camera (12) mounted on top) and at least partly illuminated by the vehicle (Fig. 1 also shows that due to the placement of the camera the image captured will be illuminated by the vehicle's headlights); determining for each pixel in the image a light decrease gradient (edge processor uses Sobel Edge detection which is a way of finding the gradient of the image; Col. 5, lines 35-41); analyzing these light decrease gradients and determining an image of the road edges (true peak detection; Col. 5, line 42); mathematically discrimination a gradient from the image of the road edges (lane marker detector component distinguishes between other edges of the image and the actual lane markers; Col. 5, lines 50-56). However, Nichani

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does not teach analyzing this discrimination and determining an angle of a bend of the road.

Yasui teaches a lane detection system that calculates a radius of a curvature of a road ahead of a running vehicle and the curve is found using an angle formed between the two tangents (Col. 2, lines 32-41). Thus Yasui's teachings of finding the radius using an angle formed between two tangents read on the claimed determining an angle of the bend. Therefore, it would have been obvious for one ordinarily skilled in the art at the time of the invention to combine Nichani's road lane detection system with Yasui's method of finding the radius using an angle of tangents in order to obtain an accurate curvature of the road (Yasui Col. 2, lines 39-40).

As to claim 2, Nichani teaches wherein the gradient of an elementary image part corresponds to a decrease vector of light formed between adjacent pixels (each pixel within the image is represented in grayscale, the edge detection is calculating the gradient between the pixels by selecting significant gradient magnitude and the gradient angle is the direction of the gradient (Col. 5, lines 29-34); thus the above forms the definition of a vector by having both magnitude and direction).

As to claim 3, Nichani teaches wherein the analysis of the light decrease gradients comprises a thresholding of the decrease vectors and an elimination of the decrease vectors outside the threshold (the feature edges that corresponds to a pair of land markers edges subject to a threshold width of a lane marker; Col. 5, lines 50-56).

9. Claims 4-5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nichani in view of Yasui applied to claims 1-3 above, and further in view of Kuwano et al. (US 6,501,856 hereinafter "Kuwano")

As to claim 4, Nichani and Yasui do not teach wherein the mathematical discrimination comprises counting the elementary image parts having a vector oriented in one direction and the elementary image parts have a decrease vector oriented in the opposite direction. Kuwano teaches scanning an image and calculating the edge pairs of the image and counting them and putting them in a table format (Fig. 23). The edge pairs are vectors going in opposite directions. Thus Kuwano's edge pair technique reads on the claimed counting of vectors going in different directions. Therefore, it would have been obvious for one ordinarily skilled in the art at the time of the invention to combine Nichani and Yasui's road lane detection system with Kuwano's edge detection image processing method in order to better extract edges.

As to claim 5, Kuwano teaches wherein the counting of the elementary image parts is carried out pixel column by pixel column, or by groups of pixel columns (Fig. 22 shows that edge pairs may be found in vertical or horizontal directions).

As to claim 11, it is the same as claim 4. Please see claim 4 for detail analysis.

10. Claims 6-9 and 12-13, 16-18, 21-22 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nichani in view of Yasui applied to claims 1-3 above, and further in view of Stam et al. (US 2003/0123706 hereinafter "Stam").

As to claim 6, Nichani and Yasui do not teach wherein the analysis of the discrimination is carried out by a neural network. Stam teaches decision rules may be implemented using a neural network (Paragraph [0211] lines 19-21). Thus Stam's neural network for controlling vehicle lights reads on the claimed neural network. Therefore, it would have been obvious for one ordinarily skilled in the art at the time of the invention to combine Nichani and Yasui's road lane detection system with Stam's neural network in order to have a more automated system.

As to claim 7, Stam teaches the control of the a vehicle light using neural network but does not teach wherein the neural network has previously learnt geometries of bends and corresponding mathematical discriminations. However, it is obvious to substitute the conditions that a neural network can learn.

As to claim 8, Nichani and Yasui teach a camera mounted in the vehicle (Fig. 1), an image-processing unit (Nichani 74, Fig. 2) but does not teach of a neural network. Stam teaches a system for controlling exterior vehicle lights using a neural network ([0211]). Thus Stam's neural network for controlling vehicle lights reads on the claimed neural network. Therefore, it would have been obvious for one ordinarily skilled in the

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art at the time of the invention to combine Nichani and Yasui's road lane detection system with Stam's neural network in order to have a more automated system.

As to claim 9, Stam teaches wherein the neural network is integrated in the image-processing unit (image processing routine, [0211] line 4; decision rules may be implemented using a neural network, [0211] lines 19-21).

As to claims 12-13, they are the same as claim 6. Please see above for detail analysis.

As to claims 16-18, they are the same as claim 7. Please see above for detail analysis.

As to claims 21-22 and 25-26, they are the same as claim 8. Please see above for detail analysis.

11. Claims 14-15, 19-20, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nichani in view of Yasui and Kuwano as applied to claims 4, 5 and 11 above, and further in view of Stam.

As to claim 14, Nichani, Yasui and Kuwano do not teach wherein the analysis of the discrimination is carried out by a neural network. Stam teaches decision rules may be implemented using a neural network (Paragraph [0211] lines 19-21). Thus Stam's neural network for controlling vehicle lights reads on the claimed neural network.

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Therefore, it would have been obvious for one ordinarily skilled in the art at the time of the invention to combine Nichani and Yasui's road lane detection system with Stam's neural network in order to have a more automated system.

As to claim 15, it is the same as claim 14. Please see above for details.

As to claim 19, Stam teaches the control of the a vehicle light using neural network but does not teach wherein the neural network has previously learnt geometries of bends and corresponding mathematical discriminations. However, it is obvious to substitute the conditions that a neural network can learn.

As to claim 20, it is the same as claim 19. Please see above for details.

As to claim 23, Nichani, Yasui and Kuwano teach a camera mounted in the vehicle (Fig. 1), an image-processing unit (Nichani 74, Fig. 2) but does not teach of a neural network. Stam teaches a system for controlling exterior vehicle lights using a neural network ([0211]). Thus Stam's neural network for controlling vehicle lights reads on the claimed neural network. Therefore, it would have been obvious for one ordinarily skilled in the art at the time of the invention to combine Nichani and Yasui's road lane detection system with Stam's neural network in order to have a more automated system.

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As to claim 24, it is the same as claim 23. Please see above for details.

12. Claims 10 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nichani in view of Yasui and Stam applied to claims 6-9 and 12-20 above, and further in view of Liao (US 5,550,717).

As to claim 10, Nichani, Yasui and Stam does not teach bend detecting system is connected to a vehicle headlight, movable or fixed and modulated for intensity. Liao teaches a direction turning device for a vehicle headlight, wherein the headlight turns in the direction of the car turn (Col. 1, lines 27-32). Therefore, Liao's turning headlight reads on the claimed movable headlight. Therefore, it would have been obvious for one ordinarily skilled in the art at the time of the invention to combine Nichani, Yasui and Stam's road lane detection system with a tunable vehicle headlight in order to increase the illuminated area upon changes of direction of the automobile (Liao Col. 1, lines 30-32).

As to claim 27, it is the same as claim 10. Please see above for detail analysis.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Nouso (US 5,301,115) teaches an apparatus for detecting the travel path of a vehicle using image analysis.

Kakinami et al. (US 5,991,427) teaches a method for detecting a lane on a road.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Claire Wang whose telephone number is 571-270-1051. The examiner can normally be reached on Mid-day flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on 571-272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Claire Wang
02/27/2007



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SUPERVISORY PATENT EXAMINER